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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,180	12/02/2003	Peter Loftus	84717 3057 KAW	2048
20736	7590	11/18/2005		
MANELLI DENISON & SELTER 2000 M STREET NW SUITE 700 WASHINGTON, DC 20036-3307			EXAMINER VERDIER, CHRISTOPHER M	
			ART UNIT	PAPER NUMBER
			3745	

DATE MAILED: 11/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/725,180

Applicant(s)

LOFTUS, PETER

Examiner

Christopher Verdier

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,10,13-18 and 20-28 is/are rejected.
- 7) ☒ Claim(s) 8,11,12 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10-4-05</u> . | 6) <input type="checkbox"/> Other: _____ |

Election/Restrictions

Applicant's election without traverse of the species of figures 1-5 in the reply filed on October 26, 2005 is acknowledged.

Claim 9 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in the United Kingdom on December 20, 2002. It is noted, however, that applicant has not filed a certified copy of the United Kingdom application as required by 35 U.S.C. 119(b).

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the means to close the gap by axial displacement of casing segments mounted on an eccentric rotation arrangement (claim 10), and the means to periodically set a reference datum for the desired value of the gap and means to operate an open loop control system strategy dependent on response from the means to detect rub contact (claim 28) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to because the first sheet of drawings labeled as “Prior Art” has no figure number. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of

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the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "55". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The abstract of the disclosure is objected to because it contains the legal term "means" (line 12) which should be deleted. Correction is required. See MPEP § 608.01(b).

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The disclosure is objected to because of the following informalities: Appropriate correction is required.

There is no brief description of the figure in the first sheet of drawings labeled as “Prior Art” which has no figure number. This should be provided in the section of the specification that briefly describes the drawings.

On page 8, line 9, “079390” should be changed to -- 0790390 --.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). **Applicant is respectfully requested to carefully compare the following claims with the specification to verify that the recited claim language appears in the specification, and to amend the claims and/or specification accordingly.** Correction of the following is required:

Claim 21, last three lines, which recite that the responses to rub contact can be determined by the means to detect rub contact and/or the control means.

Claim 22, lines 1-3, which recite that the distinct responses from each singer element are determinable by the means to detect rub contact and/or the control means.

Claim 28, which recites means to periodically set a reference datum for the desired value of the gap and means to operate an open loop control strategy dependent upon responses from the means to detect rub contact.

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Examiner's Suggestion to Claim Language

The following are suggestions to improve the clarity and precision of the claims:

In claim 4, line 1, "rotor" may be deleted.

Claim Objections

Claims 2, 5-8, 10-12, 14-17, 20, 22, and 28 are objected to because of the following informalities: Appropriate correction is required.

In claim 2, line 2, "is" should be changed to -- detects the rub contact --.

In claim 5, line 2, "is" should be changed to -- closes the gap --.

In claim 10, line 2, "is" should be changed to -- closes the gap --.

In claim 14, line 1, "1wherein" should be changed to -- 1 wherein --.

In claim 15, line 1, "1wherein" should be changed to -- 1 wherein --.

In claim 20, lines 3-4, "in order to approximate rub contact position" is non-idiomatic.

In claim 22, line 2, "is" should be changed to -- are --.

In claim 28, line 4, "mean" should be changed to -- means --.

Claim 19 (which depends on claim 18 when dependent on claim 2, where claim 18 is dependent on claim 1) is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). Accordingly, claim 19 has not been further treated on the merits.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10, 15, 17, and 21-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 10, last line, “them” is indefinite because it is unclear which elements this refers to. Claim 15, line 4, which recites “and/or”, renders the claim indefinite, because taken in conjunction with the term “and/or” in line 3, it is unclear as to just what permutations are included. Claim 17, line 3, which recites “and/or” in two occurrences, renders the claim indefinite, because taken in conjunction with the term “and/or” in line 2, it is unclear as to just what permutations are included. Claim 21, line 4, which recites “and/or”, renders the claim indefinite when taken in conjunction with the term “or” in line 2, because it is unclear as to just what permutations are included. Claim 22, line 3, which recites “and/or”, renders the claim indefinite, because taken in conjunction with the terms “or” and “and/or” in claim 21, it is unclear as to just what permutations are included. Claim 23, which includes the alternative expression “or” in lines 2 and 3, renders the claim indefinite, because taken in conjunction with the terms “or” and “and/or” in claim 21, it is unclear as to just what permutations are included.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 5-7, 13-14, 16-18, 20, and 24-27 (as far as claim 17 is definite and understood) are rejected under 35 U.S.C. 102(b) as being anticipated by West 3,227,418. Note the rotor system in figure 9, comprising a rotary assembly 13 within a casing 20 with a gap between a tip edge of the rotary assembly and the casing, means to close the gap 39 until rub contact between the tip edge and the casing, and means to detect rub contact 65 whereupon control means 66/67 act to open the gap to a desired value. The means to detect rub contact is by detection of vibration, because the sensor 65 detects stresses or heat within the casing 20 that result from contact between the casing 20 and the blade tips, which are a measure of vibration caused by the rubbing contact. The means to close the gap 39 closes the gap by constriction of the casing, with the constriction being radial (see figures 4-5 and 7-8), and the constriction being tangential (see figure 6). The control means 66/67 also controls the means to close the gap 39 between the rotary assembly and the casing. The means to detect rub contact 65 comprises a sensor located to determine rub contact throughout the casing. The control means 66/67 acts dependent on the means to detect vibration in order to selectively open the gap to the desired value dependent on the vibration detected. The desired value for the gap is dependent upon the severity of vibration. Concerning claim 18, the recitation that the means to detect rub contact 65 will allow determination of the point of rub contact by a triangulation technique is a recitation of intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the

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claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Concerning claim 20, which recites that the means to detect rub contact may utilize time of flight or propagation determination in order to approximate rub contact position between the tip edge and the casing, the term “may” is not a positive recitation and is a recitation of intended use. Therefore, West can be considered such that the means to detect rub contact 65 may utilize time of flight or propagation determination in order to approximate rub contact position between the tip edge and the casing. Also disclosed is a method of regulating the gap in a turbojet engine, comprising closing the gap until rub contact between the rotary assembly and the casing, detecting the rub contact, and opening the gap thereafter to a desired value. The detection of rub contact is by determination of vibration upon the rub contact. The arrangement is provided in the turbojet engine. The engine is operated in accordance with the method.

Claims 1, 3-4, 13-14, 24, and 26-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Soviet Union Patent 757,749. Note the rotor system, comprising a rotary assembly 3 within a casing 1 with a gap between a tip edge of the rotary assembly and the casing, means to close the gap 5 until rub contact between the tip edge and the casing, and means to detect rub contact 27 whereupon control means 25 act to open the gap to a desired value. The rotary assembly is formed from compressor blades secured about an unnumbered rotary bearing. The control means 25 also controls the means to close the gap 5 between the rotary assembly and the casing. The means to detect rub contact 27 comprises a sensor located to determine rub contact throughout the casing. Also disclosed is a method of regulating the gap in a gas turbine

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engine, comprising closing the gap until rub contact between the rotary assembly and the casing, detecting the rub contact, and opening the gap thereafter to a desired value. The engine is operated in accordance with the method.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10 and 15 (as far as claims 10 and 15 are definite and understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over West 3,227,418 in view of Colley 4,330,234. West discloses a rotor system substantially as claimed as set forth above, including a means to close the gap 39, and a sensor 65. However, West does not disclose that the means to close the gap between the rotary assembly and the casing is by axial displacement of casing segments mounted upon an eccentric rotation arrangement whereby rotation of the eccentric rotation arrangement alters the angular presentation between each segment and the rotary assembly in order to vary the gap between them to the desired value (claim 10), and does not disclose that the sensor comprises multiple sensors (claim 15).

Colley shows a rotor tip clearance control arrangement whereby a means to close a gap 37 between a rotary assembly 16 and a casing 18 is by axial displacement of casing segments of

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18 mounted upon an eccentric rotation arrangement 27 whereby rotation of the eccentric rotation arrangement alters the angular presentation between each segment and the rotary assembly in order to vary the gap between them to the desired value, with multiple sensors 42 that sense the clearance, for the respective purposes of providing high actuating forces on the casing to overcome sealing forces generated by rotary assembly, and allowing averaging out of cyclic errors resulting from non-circularity of the casing.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the rotor system of West such that the means to close the gap between the rotary assembly and the casing is by axial displacement of casing segments mounted upon an eccentric rotation arrangement whereby rotation of the eccentric rotation arrangement alters the angular presentation between each segment and the rotary assembly in order to vary the gap between them to the desired value, and such that the sensor comprises multiple sensors, as taught by Colley, for the respective purposes of providing high actuating forces on the casing to overcome sealing forces generated by rotary assembly, and allowing averaging out of cyclic errors resulting from non-circularity of the casing.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over West 3,227,418 in view of European Patent Application 578,285. West discloses a rotor system calibration arrangement substantially as claimed as set forth above, including a control means 66 that acts to open the gap to a desired value, but does not disclose that the control means includes means to periodically set a reference datum for the desired value of the gap and does not disclose means to

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operate an open loop control strategy dependent on responses from the means to detect rub contact. Rather, the control loop is a closed loop control system.

European Patent Application 578,285 shows a rotor system clearance control arrangement whereby a control means 118 acts to open a clearance gap between a rotary assembly 58 and a casing 16 to a desired value, with the control means including means to periodically set a reference datum for the desired value of the gap (see column 4, lines 37-49 noting the comparison of the real time value of the gap with the schedule of magnitudes of the gap) and with means to operate an open loop control strategy (the computer instructions) dependent on responses from a means to detect rub contact 116, for the purpose of adjusting the gap clearance to maximize the efficiency.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the rotor system of West such that the control means includes means to periodically set a reference datum for the desired value of the gap and such that it includes means to operate an open loop control strategy dependent on responses from the means to detect rub contact, as taught by European Patent Application 578,285, for the purpose of adjusting the gap clearance to maximize the efficiency.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Japanese Patents 6-137,106 and 62-75,001 are cited to show clearance control arrangements for turbines based on measured clearance parameters. These references could also have been applied as they anticipate at least claim 1, but are not applied at this time to avoid multiple rejections.

Baker is cited to show proximity sensing of clearance in a gas turbine engine.

Ress is cited to show a computerized clearance control arrangement in a gas turbine engine.

Allowable Subject Matter

Claims 8 and 11-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

No determination may be made at this time with regard to claims 21-23, due to the indefinite nature of the claims.

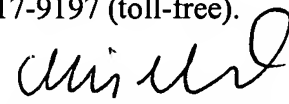
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
November 4, 2005


Christopher Verdier
Primary Examiner
Art Unit 3745